

Notice of Allowability	Application No.	Applicant(s)	
	09/548,213	MATSUDA ET AL.	
	Examiner	Art Unit	
	Edward Tso	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to a supplemental oath filed 7/19/2010 and IDS filed 8/3/2010.
2. ☒ The allowed claim(s) is/are 1-10, 101, 102, 104, 105, 107-110, 112-119, 121-123, 125-127, 129, 148-172, 174-176, 178-186, 188-191, 193-196, 198 and 199.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/578,805.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>8/3/2010</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

/Edward Tso/
Primary Examiner, Art Unit 2858

Art Unit: 2858

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

New claims (not previously presented in the original patent) have been underlined.

All claims are listed here for easy reference.

1. (Original) A system for controlling the supply of power from an external power source to rechargeable batteries in an apparatus which can be powered either by the external power source or the rechargeable batteries, comprising:

 a first detector for detecting a difference between a maximum permissible charging current allowed by the rechargeable batteries and a charging current flowing to the rechargeable batteries;

 a second detector for detecting a maximum useable current by detecting a difference between a maximum supplyable current allowed by the external power source and the current being consumed by the apparatus;

 a third detector for detecting a difference between the maximum useable current and the charging current flowing to the rechargeable batteries; and

 a controller for controlling power supplied from the external power source to the rechargeable batteries in accordance with the differences detected by the first and third detectors so that the charging current flowing to the rechargeable batteries does not exceed the maximum permissible charging current and does not exceed the maximum useable current.

2. (Original) A system for controlling as set forth in claim 1, further comprising a fourth detector for detecting a difference between a maximum permissible supply voltage allowed by said rechargeable batteries and a voltage applied to said rechargeable batteries, said control means controlling the power supplied from the external power source to the rechargeable batteries in accordance with the difference detected by the fourth detector so that the voltage applied to the rechargeable batteries does not exceed the maximum permissible supply voltage.

Art Unit: 2858

3. (Original) A system for controlling the supply of power from an external power source to rechargeable batteries in an apparatus which can be powered by either the external power source or the rechargeable batteries, comprising:

a first detector for detecting a difference between a maximum permissible charging current allowed by the rechargeable batteries and a charging current flowing to the rechargeable batteries;

a second detector for detecting a difference between a lowest permissible output voltage allowed by the external power source and an output voltage which is being output by the external power source; and

a controller for controlling power supplied from the external power source to the rechargeable batteries in accordance with the differences detected by the first and second detectors so that the charging current flowing to the rechargeable batteries does not exceed the maximum permissible charging current and the output voltage being output by the external power source is not less than the lowest permissible output voltage.

4. (Original) A control system for controlling as set forth in claim 3, further comprising a third detector for detecting a difference between the maximum permissible supply voltage allowed by the rechargeable batteries and a voltage applied to said rechargeable batteries, said control means controlling the power supplied from the external power source to the rechargeable batteries in accordance with the difference detected by the third detector so that the voltage applied to the rechargeable batteries does not exceed the maximum permissible supply voltage.

5. (Original) A system for controlling as set forth in claim 1, wherein said controller controls the power supplied from the external power source to the rechargeable batteries by determining if either the first or third detector detects a negative difference thus indicating that the charging current exceeds a maximum, wherein if either of the first or third detector detects a negative difference, the controller selects the largest negative difference and controls the charging current to increase the largest negative difference to a zero difference, and wherein if neither of the first or third detector detects a negative difference, the controller selects the largest positive difference and controls the charging current to decrease the largest positive difference to a zero difference.

6. (Original) A system for controlling as set forth in claim 2, wherein said controller controls the power supplied from the external power source to the rechargeable batteries by determining if any of the first, third or fourth detector detects a negative difference thus indicating that the charging current or the supply voltage exceeds a maximum, wherein if any of the first, third or fourth detector detects a negative difference, the controller selects the largest negative difference and controls the charging current to increase the largest negative difference to a zero difference, and wherein if none of the first, third or fourth detector detects a negative difference, the controller selects the largest positive difference and controls the charging current to decrease the largest positive difference to a zero difference.

Art Unit: 2858

7. (Original) A system for controlling as set forth in claim 3, wherein said controller controls the power supplied from the external power source to the rechargeable batteries by determining if either of the detectors detects a negative difference thus indicating that the charging current exceeds a maximum or the output voltage is less than a minimum, wherein if either of the detectors detects a negative difference, the controller selects the largest negative difference and controls the charging current to increase the largest negative difference to a zero difference, and wherein if neither of the detectors detects a negative difference, the controller selects the largest positive difference and controls the charging current to decrease the largest positive difference to a zero difference.

8. (Original) A system for controlling as set forth in claim 4, wherein said controller controls the power supplied from the external power source to the rechargeable batteries by determining if any of the detectors detects a negative difference thus indicating that a current or a voltage is greater than a maximum or less than a minimum, wherein if any of the detectors detects a negative difference, the controller selects the largest negative difference and controls the charging current to increase the largest negative difference to a zero difference, and wherein if none of the detectors detects a negative difference, the controller selects the largest positive difference and controls the charging current to decrease the largest positive difference to a zero difference.

9. (Original) A system for controlling the supply of power from a charger circuit to rechargeable batteries, the rechargeable batteries being used to supply power to a power supply circuit, comprising:

a sense resistor having two ends, located between the rechargeable batteries and a connection point for the charger circuit and the power supply circuit, the sense resistor detecting current flowing into and out of the rechargeable batteries;

a current measurement device having two inputs connected respectively to the two ends of the sense resistor, the current measurement device determining which of the two inputs has a larger voltage and generating a voltage in accordance with the difference between the voltages of the two inputs to thereby measure the current flowing into or out of the rechargeable battery; and

a control circuit regulating to a constant current the current flowing into the rechargeable batteries, based on the current flowing into the rechargeable batteries detected by the sense resistor.

10. (Original) A system for controlling as set forth in claim 9, wherein the control circuit has two inputs connected respectively to the two ends of the sense resistor.

11-100. (Cancelled)

101. (Previously Presented) An electronic apparatus having an input section for inputting power from a power source and capable of charging a battery by using the power from the input section while the electronic apparatus makes a load

Art Unit: 2858

operate by applying the power input from the input section to the load, an output voltage of the power source being substantially a constant voltage, the output voltage of the power source falling to less than said constant voltage when the power source outputs more than a predetermined current value, the power applied to the load from the input section varying based on the state of the load, the electronic apparatus comprising:

a power input sensor for obtaining power-input information by sensing an input of the power from the input section;

a charger for charging the battery by using the power from the input section;
a charge control circuit for controlling the charging power the charger supplies to the battery based on the power input information obtained by the power input sensor so that a sum of the power applied to the load and the power charged to the battery from the input section is substantially in a current range in which said output voltage of the power source is substantially the constant voltage; and

a charging voltage detector for detecting a charging voltage of the battery, wherein the charge control circuit controls the charging voltage so that the charging voltage detected by the charging voltage detector becomes a value assigned to the battery or lower.

102. (Previously Presented) An electronic apparatus as set forth in claim 101, further comprising:

a charging current detector for detecting a charging current of the battery, wherein the charge control circuit controls the charging current based on the detected charging current so that the charging current becomes a value assigned to the battery or lower.

103. (Cancel)

104. (Previously Presented) An electronic apparatus as set forth in claim 101, wherein the power source is able to supply a maximum permissible supply current of the power source in the current range.

105. (Previously Presented) A charging apparatus for an electronic apparatus that has an input section for inputting power from a power source and is capable of charging a battery by using the power from the input section while the electronic apparatus makes a load operate by applying the power input from the input section to the load, an output voltage of the power source being substantially a constant voltage, the output voltage of the power source falling to less than said constant voltage when the power source outputs more than a predetermined current value, the power applied to the load from the input section varying based on the state of the load, the charging apparatus comprising:

a charger for charging the battery by using the power from the input section;

a charge control circuit for controlling the charging power the charger supplies to the battery, based on power input information obtained by a power input sensor for obtaining the power input information by sensing an input of the power from the input section, so that a sum of the power applied to the load and the power charged

Art Unit: 2858

to the battery from the input section is substantially in a current range in which said output voltage of the power source is substantially the constant voltage, wherein the charge control circuit controls the charging current, based on a charging current detected by a charging current detector for detecting the charging current of the battery, so that the charging current becomes a value assigned to the battery or lower.

106. (Cancelled)

107. (Previously Presented) A charging apparatus as set forth in claim 105, wherein the charge control circuit further controls the charging voltage so that a voltage detected by a charging voltage detector for detecting the charging voltage of the battery becomes a value assigned to the battery or lower.

108. (Previously Presented) A charging apparatus as set forth in claim 105, wherein the power source is able to supply a maximum permissible supply current of the power source in the current range.

109. (Previously Presented) A charge control circuit for an electronic apparatus that has an input section for inputting power from a power source and a charger for charging a battery by using the power from the input section while the electronic apparatus making a load operate by applying the power input from the input section to the load, an output voltage of the power source being substantially a constant voltage, the output voltage of the power source falling to less than said constant voltage when the power source outputs more than a predetermined current value, the power applied to the load from the input section varying based on the state of the load, the charge control circuit comprising:

a control circuit for controlling the charging power the charger supplies to the battery, based on power input information obtained by a power input sensor for obtaining the power input information by sensing an input of the power from the input section, so that a sum of the power applied to the load and the power charged to the battery from the input section is substantially in a current range in which said output voltage of the power source is substantially the constant voltage, wherein

the control circuit controls the charging voltage so that a voltage detected by a charging voltage detector for detecting the charging voltage of the battery becomes a value assigned to the battery or lower.

110. (Previously Presented) A charge control circuit as set forth in claim 109, wherein the control circuit controls the charging current based a charging current detected by a charging current detector for detecting the charging current of the battery so that the charging current becomes a value assigned to the battery or lower.

111. (Cancelled)

Art Unit: 2858

112. (Previously Presented) A charge control circuit as set forth in claim 109, wherein the power source is able to supply a maximum permissible supply current of the power source in the current range.

113. (Previously Presented) An electronic apparatus having a charger for outputting a charging current to charge a battery by using power of a power source and supplying the power from the battery to a load to make the load operate, the electronic apparatus comprising:

a sense resistor provided between a connection point between the power source and the charger and the battery, for detecting a charging current flowing into the battery and for detecting a current flowing out from the battery; and

a controller for controlling the charging current from the charger based on a current value measured by using the sense resistor.

114. (Previously Presented) An electronic apparatus as set forth in claim 113, further comprising:

a current measuring section for discriminating which one of two input potentials applied to both ends of the sense resistor is larger, and for detecting both a charging current and a discharging current from a voltage generated according to a difference between the two input potentials.

115. (Previously Presented) An electronic apparatus as set forth in claim 113, further comprising:

a remaining-amount determining section for determining a remaining amount of current charged to the battery based on a charging current value measured by the sense resistor.

116. (Previously Presented) An electronic apparatus as set forth in claim 113 further comprising:

a remaining-amount determining section for determining a remaining amount of current charged to the battery based on a discharging current value measured by the sense resistor.

117. (Previously Presented) An electronic apparatus having a charger for supplying a charging current to a battery by using power of a power source to make a load operate based on the power supplied from the battery, the electronic apparatus comprising:

a sense resistor disposed between the battery and a connection point between the power source and the charger, for detecting a charging current flowing into the battery in order to control the charging current of the charger; and

Art Unit: 2858

a detector for detecting a discharging current by the sense resistor when the power from the battery is supplied to the load.

118. (Previously Presented) An electronic apparatus having an input section for inputting power from a power source and capable of charging a battery by using the power from the input section while making a load operate by applying the power input from the input section to the load, a current applied to the load from the input section varying based on the state of the load, the electronic apparatus comprising:

a power input sensor which obtains power-input information by sensing an input of the power from the input section;

a charger which charges the battery by using a current from the input section;
a charge control circuit which controls the charger to change a current charged to the battery by determining whether an input current from the power source reaches a predetermined value or not in accordance with the power-input information sensed by the power input sensor, so that a sum of the current applied to the load and the current charged to the battery from the input section does not exceed the predetermined value; and

a charging voltage detector which detects a charging voltage of the battery, wherein the charge control circuit controls the charging voltage so that the charging voltage detected by the charging voltage detector becomes a value assigned to the battery or lower.

119. (Previously Presented) An electronic apparatus as set forth in claim 118, further comprising:

a charging current detector which detects a charging current of the battery, wherein the charge control circuit controls the charging current based on the detected charging current so that the charging current becomes a value assigned to the battery or lower.

120. (Cancelled)

121. (Previously Presented) An electronic apparatus as set forth in claim 118, wherein the predetermined value is a maximum permissible supply current of the power source.

122. (Previously Presented) A charging apparatus for an electronic apparatus that has an input section for inputting power from a power source and is capable of charging a battery by using the power from the input section while the electronic apparatus making a load operate by applying the power input from the input section to the load, a current applied to the load from the input section varying based on the state of the load, the charging apparatus comprising:

a charger which charges the battery by using the power from the input section;

a charge control circuit which controls the charger to change a current charged to the battery by determining whether an input current from the power

Art Unit: 2858

source reaches a predetermined value or not in accordance with the power-input information sensed by a power input sensor which obtains the power input information by sensing an input of power from the input section, so that a sum of the current applied to the load and the current charged to the battery from the input section does not exceed the predetermined value, wherein the charge control circuit further controls the charging voltage so that a voltage detected by a charging voltage detector for detecting the charging voltage of the battery becomes a value assigned to the battery or lower.

123. (Previously Presented) A charging apparatus as set forth in claim 122, wherein the charge control circuit controls the charging current, based on a charging current detected by a charging current detector for detecting the charging current of the battery, so that the charging current becomes a value assigned to the battery or lower.

124. (Cancelled)

125. (Previously Presented) A charging apparatus as set forth in claim 122, wherein the predetermined value is a maximum permissible supply power of the power source.

126. (Previously Presented) A charge control circuit for an electronic apparatus that has an input section for inputting power from a power source and a charger for charging a battery by using the power from the input section and while the electronic apparatus making a load operate by applying the power input from the input section to the load, a current applied to the load from the input section varying based on the state of the load, the charge control circuit comprising:

a charge control circuit which controls the charger to change a current charged to the battery by determining whether an input current from the power source reaches a predetermined value or not in accordance with the power-input information sensed by a power input sensor which obtains the power input information by sensing an input of power from the input section, so that a sum of the current applied to the load and the current charged to the battery from the input section does not exceed the predetermined value, wherein

the control circuit controls the charging voltage so that a voltage detected by a charging voltage detector for detecting the charging voltage of the battery becomes a value assigned to the battery or lower.

127. (Previously Presented) A charge control circuit as set forth in claim 126, wherein the control circuit controls the charging current based a charging current detected by a charging current detector for detecting the charging current of the battery so that the charging current becomes a value assigned to the battery or lower.

128. (Cancelled)

Art Unit: 2858

129. (Previously Presented) A charge control circuit as set forth in claim 126, wherein the predetermined value is a maximum permissible supply power of the power source.

130-147. (Cancelled)

148. (Previously Presented) An electronic apparatus connected to an AC adapter which supplies DC power, capable of charging a battery by using power from the AC adapter while making a load operate by using the DC power supplied from the AC adapter, the power given to the load varying based on the state of the load, the electronic apparatus comprising:

a connector which receives the DC power from the AC adapter;

a charger, connected to the battery, which supplies charging power to the battery by using the power from the connector; and

a charge control circuit which controls the charger to control the charging power the charger supplies to the battery so that a sum of the power applied to the load and the power charged to the battery becomes a value assigned in advance.

149. (Previously Presented) An electronic apparatus as set forth in claim 148, further comprising a charging current detector which detects a charging current supplied to the battery, wherein the charge control circuit controls the charging current so that the charging current becomes equal to or lower than a value assigned to the battery, based on a value of the charging current to the battery detected by the charging current detector.

150. (Previously Presented) An electronic apparatus as set forth in claim 148, further comprising a charging voltage detector which detects a charging voltage supplied to the battery, wherein the control circuit controls the charging voltage so that the charging voltage becomes equal to or lower than a value assigned to the battery, based on a value of the charging voltage to the battery detected by the charging voltage detector.

151. (Previously Amended) An electronic apparatus as set forth in claim 148, wherein the value assigned in advance is a maximum permissible supply power of the AC adapter.

152. (Previously Presented) An electronic apparatus as set forth in claim 148, wherein the charge control circuit controls the charging power the charger supplies to the battery, based on sensed information on the power input from the connector, so that a sum of the power applied to the load and the power charged to the battery becomes the value assigned in advance.

153. (Previously Presented) A charging apparatus for charging a battery for an electronic apparatus that is connected to an AC adapter and that is capable of charging the battery by using power from the AC adapter while the electronic apparatus making a load operate by using DC power supplied from the AC adapter,

Art Unit: 2858

the power given to the load varying based on the state of the load, the charging apparatus comprising:

a charger, connected to the battery, which supplies charging power to the battery by using the power from a connector that is connected to the AC adapter to receive the DC power from the AC adapter; and

a charge control circuit which controls the charger to control the charging power the charger supplies to the battery so that a sum of the power applied to the load and the power charged to the battery becomes a value assigned in advance.

154. (Previously Presented) A charging apparatus as set forth in claim 153, wherein the charge control circuit controls the charging current so that a charging current becomes equal to or lower than the value assigned to the battery, based on a detected value of the charging current to the battery.

155. (Previously Presented) A charging apparatus as set forth in claim 153, wherein the charge control circuit controls a charging voltage so that the charging voltage becomes equal to or lower than a value assigned to the battery, based on a detected value of the charging voltage to the battery.

156. (Previously Presented) A charging apparatus as set forth in claim 153, wherein the value assigned in advance is a maximum permissible supply power of the AC adapter.

157. (Previously Presented) A charging apparatus as set forth in claim 153, wherein the charge control circuit controls the charging power the charger supplies to the battery so that a sum of the power applied to the load and the power charged to the battery becomes the value assigned in advance, based on sensed information on the power input from the connector.

158. (Previously Presented) A charge control circuit for controlling a charger in an electronic apparatus having a connector connected to an AC adapter to receive DC power from the AC adapter, the charger being connected to a battery and supplying charging power to the battery by using the power from the connector, the electronic apparatus making a load operate by using the DC power supplied from the AC adapter, the power given to the load varying based on the state of the load, the charge control circuit comprising:

a control circuit which controls the charger to control the charging power the charge supplies to the battery so that a sum of the power applied to the load and the power charged to the battery becomes a value assigned in advance.

159. (Previously Presented) A charge control circuit as set forth in claim 158, wherein the control circuit controls a charging current based on a detected value of the charging current to the battery so that the charging current becomes equal to or lower than a value assigned to the battery.

Art Unit: 2858

160. (Previously Presented) A charge control circuit as set forth in claim 158, wherein the control circuit controls a charging voltage based on a detected value of the charging voltage to the battery so that the charging voltage becomes equal to or lower than a value assigned to the battery.

161. (Previously Presented) A charge control circuit as set forth in claim 158, wherein the value assigned in advance is a maximum permissible supply power of the AC adapter.

162. (Previously Presented) A charge control circuit as set forth in claim 158, wherein the control circuit controls the charging power the charger supplies to the battery, based on sensed information on the power input from the connector, so that a sum of the power applied to the load and the power charged to the battery becomes the value assigned in advance.

163. (Previously Presented) An electronic apparatus capable of charging a battery by using power from a power source while making a load operate by using the power supplied from the power source, the electronic apparatus comprising:
a charger which supplies charging power to the battery by using the power from the power source;
a detector which detects the power applied to the load;
a charging current detector detects a charging current to the battery; and
a control circuit which controls the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load that has been detected becomes a value assigned in advance, and which controls the charging current based on the detected charging current so that the charging current to the battery becomes equal to or lower than a charging current value assigned in advance to the battery.

164. (Previously Presented) An electronic apparatus capable of charging a battery by using power from a power source while making a load operate by using the power supplied from the power source, the electronic apparatus comprising:
a charger which supplies charging power to the battery by using the power from the power source;
a detector which detects the power applied to the load;
a charging voltage detector which detects a charging voltage to the battery;
and
a control circuit which controls the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load that has been detected becomes a value assigned in advance, and which controls the charging voltage based on the detected charging voltage so that the charging voltage becomes within a voltage value assigned in advance to the battery.

165. (Previously Presented) An electronic apparatus capable of charging a battery by using power from a power source having a prescribed maximum

Art Unit: 2858

permissible supply power while making a load operate by using the power supplied from the power source, the electronic apparatus comprising:

a charger which supplies charging power to the battery by using the power from the power source;

a detector which detects the power applied to the load; and

a control circuit which controls the charger to adjust the charger to supply the charging power so that the charging power is the prescribed maximum permissible supply power minus the detected power applied to the load.

166. (Previously Presented) A charging apparatus for an electronic apparatus capable of charging a battery by using power from a power source while the electronic apparatus makes a load operate by using the power supplied from the power source, the charging apparatus comprising:

a charger which supplies charging power to the battery by using the power from the power source; and

a control circuit which controls the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load detected by a detector which detects the power applied to the load becomes a value assigned in advance, and which controls the charging current, based on a charging current value detected by a charging current detector which detects the charging current to the battery, so that the charging current to the battery becomes equal to or lower than a charging current value assigned in advance to the battery.

167. (Previously Presented) A charging apparatus for an electronic apparatus capable of charging a battery by using power from a power source while the electronic apparatus making a load operate by using the power supplied from the power source, the charging apparatus comprising:

a charger which supplies charging power to the battery by using the power from the power source; and

a control circuit which controls the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load detected by a detector which detects the power applied to the load becomes a value assigned in advance, and which controls the charging voltage, based on a charging voltage detected by a charging voltage detector which detects the charging voltage of the battery, so that the charging voltage becomes within a voltage value assigned in advance to the battery.

168. (Previously Presented) A charging apparatus for an electronic apparatus capable of charging a battery by using power from a power source having a prescribed maximum permissible supply power while the electronic apparatus makes a load operate by using the power supplied from the power source, the charging apparatus comprising:

a charger which supplies charging power to the battery by using the power from the power source; and

a control circuit which controls the charger so that the charger supplies the charging power so that the charging power is the maximum permissible supply

Art Unit: 2858

power minus the power applied to the load that has been detected by a detector which detects the power applied to the load.

169. (Previously Presented) A charge control circuit for controlling a charger for an electronic apparatus that makes a load operate by using power supplied from a power source and that has the charger for supplying charging power to a battery by using the power from the power source, the charge control circuit comprising:

a control circuit which controls the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load detected by a detector which detects the power applied to the load becomes a value assigned in advance, and which controls a charging current, based on a charging current detected by a charging current detector which detects the charging current to the battery, so that the charging current supplied to the battery becomes equal to or lower than a charging current value assigned in advance to the battery.

170. (Previously Presented) A charge control circuit for controlling a charger for an electronic apparatus that makes a load operate by using power supplied from a power source and that has the charger for supplying charging power to a battery by using the power from the power source, the charge control circuit comprising:

a control circuit which controls the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load detected by a detector which detects the power applied to the load becomes a value assigned in advance, and which controls the charging voltage, based on a charging voltage detected by a charging voltage detector which detects the charging voltage of the battery, so that the charging voltage becomes within a voltage value assigned in advance to the battery.

171. (Previously Presented) A charge control circuit for controlling a charger for an electronic apparatus that makes a load operate by using power supplied from a power source having a prescribed maximum permissible supply power and that has the charger for supplying charging power to a battery by using the power from the power source, the charge control circuit comprising:

a control circuit which controls the charger so that the charger supplies the charging power which is the prescribed maximum permissible supply power minus the power applied to the load detected by a detector which detects the power applied to the load.

172. (Previously Presented) An electronic apparatus capable of charging a battery by using power from a power source while making a load operate by using the power supplied from the power source, the power applied to the load from the power source varying based on the state of the load, the electronic apparatus comprising:

a charger which supplies charging power to the battery by using the power from the power source;

Art Unit: 2858

a charging current detector which detects a charging current to the battery;
a charge control circuit which controls the charging power the charger supplies to the battery so that a sum of the power applied to the load and the power charged to the battery from the power source becomes a value assigned in advance, and which controls the charging current based on the charging current detected by the charging current detector so that the charging current becomes a limit value assigned to the battery or a lower value; and

a charging voltage detector which detects a charging voltage of the battery, wherein the charge control circuit further controls the charging voltage so that the voltage detected by the charging voltage detector becomes a value assigned to the battery or lower.

173. (Cancelled)

174. (Previously Presented) An electronic apparatus as set forth in claim 172, wherein the pre-assigned value is a maximum permissible supply power of the power source.

175. (Previously Presented) An electronic apparatus as set forth in claim 172, wherein the charge control circuit controls the charging power the charger supplies to the battery, based on sensed information on the input from the power source, so that a sum of the power applied to the load and the power charged to the battery from the power source becomes the pre-assigned value.

176. (Previously Presented) A charging apparatus for an electronic apparatus that is capable of charging a battery by using power supplied from a power source while the electronic apparatus making a load operate by using the power from the power source, the power applied to the load from the power source varying based on the state of the load, the charging apparatus comprising:

a charger which supplies charging power to the battery by using the power from the power source; and

a charge control circuit which controls the charging power the charger supplies to the battery so that a sum of the power applied to the load and the power charged to the battery from the power source becomes a value assigned in advance, and which controls the charging current, based on a charging current detected by a charging current detector which detects the charging current to the battery, so that the charging current becomes a value assigned to the battery or a lower value, wherein

the charge control circuit further controls the charging voltage so that a charging voltage detected by a charging voltage detector which detects the voltage charged to the battery becomes a value assigned to the battery or lower.

177. (Cancelled)

178. (Previously Presented) A charging apparatus as set forth in 176, wherein the preassigned value is a maximum permissible supply power of the power source.

179. (Previously Presented) A charging apparatus as set forth in 176, wherein the charge control circuit controls the charging power the charger supplies to the battery, based on sensed information on the input from the power source, so that a sum of the power applied to the load and the power charged to the battery becomes the pre-assigned value.

180. (Previously Presented) A charge control circuit for an electronic apparatus that makes a load operate by using power supplied from a power source and that has a charger for supplying charging power to a battery by using the power from the power source, the power applied to the load from the power source varying based on the state of the load, the charge control circuit comprising:

a control circuit which controls the charging power the charger supplies to the battery so that a sum of the power applied to the load and the power charged to the battery from the power source becomes a value assigned in advance, and which controls the charging current based on a charging current detected by a charging current detector which detects the charging current to the battery so that the charging current becomes a value assigned to the battery or a lower value.

181. (Previously Presented) A charge control circuit as set forth in claim 180, wherein the control circuit further controls the charging voltage so that a charging voltage detected by a charging voltage detector which detects the voltage charged to the battery becomes a value assigned to the battery or lower.

182. (Previously Presented) A charge control circuit as set forth in 180, wherein the preassigned value is a maximum permissible supply power of the power source.

183. (Previously Presented) A charge control circuit as set forth in 180, wherein the control circuit controls the charging power the charger supplies to the battery, based on sensed information on the input from the power source, so that a sum of the power applied to the load and the power from the power source charged from the power source to the battery becomes the pre-assigned value.

184. (Previously Presented) A charge control circuit for an electronic apparatus that has an input section for inputting power from a power source and a charger for charging a battery by using the power from the input section while the electronic apparatus makes a load operate by applying the power input from the input section to the load, an output voltage of the power source being substantially a constant voltage, the output voltage of the power source falling to less than said substantially constant voltage when the power source outputs more than a predetermined current value, the power applied to the load from the input section varying based on the state of the load, the charge control circuit comprising:

a control circuit which controls the charging power the charger supplies to the battery, based on power input information obtained by a power input sensor which

Art Unit: 2858

obtains the power input information by sensing an input of the power from the input section, so that a sum of the power applied to the load and the power charged to the battery from the input section is substantially in a current range in which said output voltage of the power source is the substantially constant voltage, wherein the control circuit controls a charging voltage the charger supplies to the battery so that the charging voltage detected by a charging voltage detector becomes a value assigned to the battery or lower, wherein

the control circuit controls the charging power the charger supplies to the battery, based on sensed information on the input from the power source, so that a sum of the power applied to the load and the power from the power source charged from the power source to the battery becomes the pre-assigned value.

185. (Previously Presented) An electronic apparatus connected to an AC adapter which supplies DC current, capable of charging a battery by using current from the AC adapter while making a load operate by using the DC current supplied from the AC adapter, the current given to the load varying based on the state of the load, the electronic apparatus comprising:

a connector connected to the AC adapter, which receives DC current from the AC adapter;

a charger, connected to the battery, which supplies charging current to the battery by using the current from the connector;

a charger control circuit which controls the charger to control the charging current the charger supplies to the battery so that a sum of the current applied to the load and the current charged to the battery becomes a value assigned in advance; and a charging voltage detector which detects a charging voltage supplied to the battery, wherein

the control circuit controls the charging voltage so that the charging voltage becomes equal to or lower than a value assigned to the battery, based on a value of the charging voltage to the battery detected by the charging voltage detector.

186. (Previously Presented) An electronic apparatus as set forth in claim 185, further comprising a charging current detector which detects a charging current supplied to the battery, wherein the charge control circuit controls the charging current so that the charging current becomes equal to or lower than a value assigned to the battery, based on a value of the charging current to the battery detected by the charging current detector.

187. (Cancelled)

188. (Previously Presented) An electronic apparatus as set forth in claim 185, wherein the value assigned in advance is a maximum permissible supply current of the AC adapter.

189. (Previously Presented) An electronic apparatus as set forth in claim 185, wherein the charge control circuit controls the charging current the charger supplies to the battery, based on sensed information on the power input from the connector.

Art Unit: 2858

so that a sum of the current applied to the load and the current charged to the battery becomes the value assigned in advance.

190. (Previously Presented) A charging apparatus for charging a battery for an electronic apparatus that is connected to an AC adapter and that is capable of charging the battery by using current from the AC adapter while the electronic apparatus making a load operate by using DC current supplied from the AC adapter, the current given to the load varying based on the state of the load, the charging apparatus comprising:

a charger, connected to the battery, which supplies charging current to the battery by using the current from a connector that is connected to the AC adapter to receive the DC current from the AC adapter; and

a charger control circuit which controls the charger to control the charging current the charger supplies to the battery so that a sum of the current applied to the load and the current charged to the battery becomes a value assigned in advance, wherein

the charge control circuit controls a charging voltage so that the charging voltage becomes equal to or lower than a value assigned to the battery, based on a detected value of the charging voltage to the battery.

191. (Previously Presented) A charging apparatus as set forth in claim 190, wherein the charge control circuit controls the charging current so that a charging current becomes equal to or lower than the value assigned to the battery, based on a detected value of the charging current to the battery.

192. (Cancelled)

193. (Previously Presented) A charging apparatus as set forth in claim 190, wherein the value assigned in advance is a maximum permissible supply current of the AC adapter.

194. (Previously Presented) A charging apparatus as set forth in claim 190, wherein the charge control circuit controls the charging current the charger supplies to the battery so that a sum of the current applied to the load and the current charged to the battery becomes the value assigned in advance, based on sensed information on input from the connector.

195. (Previously Presented) A charge control circuit for controlling a charger in an electronic apparatus having a connector connected to an AC adapter to receive DC current from the AC adapter, the charger being connected to a battery and supplying charging current to the battery by using the current from the connector, the electronic apparatus making a load operate by using the DC current supplied from the AC adapter, the current given to the load varying based on the state of the load, the charge control circuit comprising:

Art Unit: 2858

a control circuit which controls the charger to control the charging current the charger supplies to the battery so that a sum of the current applied to the load and the current charged to the battery becomes a value assigned in advance, wherein the control circuit controls a charging voltage based on a detected value of the charging voltage to the battery so that the charging voltage becomes equal to or lower than a value assigned to the battery.

196. (Previously Presented) A charge control circuit as set forth in claim 195, wherein the control circuit controls a charging current based on a detected value of the charging current to the battery so that the charging current becomes equal to or lower than a value assigned to the battery.

197. (Cancelled)

198. (Previously Presented) A charge control circuit as set forth in claim 195, wherein the value assigned in advance is a maximum permissible supply current of the AC adapter.

199. (Previously Presented) A charge control circuit as set forth in claim 195, wherein the control circuit controls the charging current the charger supplies to the battery, based on sensed information on input from the connector, so that a sum of the current applied to the load and the current charged to the battery becomes the value assigned in advance.

Conclusion

Any inquiry concerning this communication should be directed to the Examiner at the below-listed number. The Examiner can normally be reached on Tue-Thu and Sat from 8:00am-6:00pm.

The Examiner's SPE is Patrick Assouad and he can be reached at 571.272.2210. The fax number for the organization where this application is assigned is 571.273.8300.

Art Unit: 2858

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